Introduction

A COMET partners project to create a prototype bibliographic and event base for wet microbursts was completed by the Atmospheric Science Program in the Department of Geosciences at the University of Louisiana at Monroe (ULM) during the summer and fall of 2003.

The project involved National Weather Service Office partners from Birmingham (BMX), Jackson (JAN), Little Rock (LZK), Memphis (MEG), Mobile (MOB), and Shreveport (SHV). The Project Directors (Jackson NWS MIC Alan E. Gerard and Associate Professor Dr. Paul J. Croft) provided primary oversight of the project. Two undergraduate ULM meteorology majors (Patrick C. Pyle and Scott F. Blair) also participated and were responsible for analysis and compilation of all materials.

This document presents a summary description (*readme* file) of the resulting components of this project. The effort is intended to assist the professional and other users in managing and focusing their efforts towards improved understanding, prediction, and response to wet microburst activity. This compilation is one step towards the integration of resources critical to make these happen.

A hard copy of the files and resources of this project are available at the ULM Atmospheric Sciences Program Climate Research Center. A cd-rom is also available so that all documents/files recorded during the research may be reviewed and used electronically as needed. A final version of this data is also hosted by the Jackson NWS office in MS.

Any questions, comments, or related information should be directed to the University of Louisiana at Monroe Atmospheric Sciences Program. Thank you for your interest, we are pleased to be of assistance.

The bibliographic and event base for wet microbursts is intended to assist those interested in the operational research and forecasting of wet microbursts. The bibliographic base provides basic information of microburst related resources (primarily electronic and journal). The event base is intended to provide data that will supplement the literature such that characteristics of the microburst population of events, and the parameters associated with and occurring prior to them, may be realized. The intent is to improve prediction, detection, and warning.

The bibliographic base consists of journal articles and websites. Journal articles were identified using a keyword “microburst” search on the AMS journal database webpage (http://ams.allenpress.com/amsonline/?request=search-simple). A search was also considered on the Cambridge Scientific Abstracts page, http://www.csa.com, to identify related international publications. This source allows viewing of foreign language

abstracts in English and thus could expand the bibliographic base. Publications found on this website were not further investigated due to the restricted time frame of the study.

In addition, keyword searches for microburst, downburst, and downdraft were used within the cd-rom, AMS Journal/Bulletin Archive, in an attempt to expand the bibliographic base. The journal article portion of the bibliographic base provides brief summaries for each article that concerns (or has relevance) to wet microburst occurrences. Dry microburst occurrences have also been included and summarized in order to consider the relationship and/or commonalities between wet and dry events. All journal articles used in the study can be found in the *bib_list* file which is time-ordered from most recent to past.

The journal base was examined to extract physical parameters associated with wet microbursts. These were used to construct a spreadsheet and combined with online resources to generate a wet microburst attributes table. The table is a combination of the population of physical parameters associated with case study events (see *parameter_base* file). The physical parameters have been organized into three subsections: thermodynamic, kinematic, and radar/miscellaneous. The miscellaneous subsection is used to organize relevant data that does not pertain to the thermodynamic or kinematic aspect of microburst events. The parameters within the table also represent a variety of combinations including: wet observed/simulated dry observed/simulated, non-event, and between wet and dry observed/simulated events. This allows the user to examine the physical properties for each event mode.

To further summarize and apply the observed wet microburst events mode of the *parameter_base* file, a conceptual model was developed. The model is an evaluation of the single/multi-cellular storm during its microburst stage. Parameter values are contained within the model to indicate data at respective heights. A summary of the data within the model is shown in a data range table located in the bottom right corner of the model.

A storm scale conceptual model was developed in addition to the basic conceptual model using radar-derived data from the five NWS office partners. This model contains radar-derived data (e.g., convergence, dBZ) of the storm at its early, mature, and microburst stages. The conceptual and storm scale models can be found at the completion of the event data document.

The journals and websites also provided a variety of imagery related to antecedent and concurrent atmospheric conditions associated with wet microbursts. The imagery was summarized by type and organized into a spreadsheet (see *imagery_base* file). The imagery materials have been categorized similar to the physical parameters, into four subsections: thermodynamic, kinematic, miscellaneous/radar, and standard analyses. The imagery and parameter spreadsheets are not printed out with other documents due to their large size.

Unfortunately, most imagery data acquired from the journal articles used in the study is not available operationally. However, operationally useful images were searched within the *imagery_base* file and summarized in the *imagery_sum* file. This file helps operational forecasters identify the journal articles that will aid in the nowcasting/forecasting microburst activity.

The web based materials were (determined through keyword search of "microburst" using an internet search engine) contain brief summaries of each website including the host of the site, the type of event that occurred (e.g., wet, dry, multiple), and also the location of the microburst event and whether widespread or isolated events prevailed (see *web_base* file). Some sites found to be inactive led the study to contact the website host. If no response was received, the site was removed from the bibliographic base.

Fourteen categories were developed organize the materials. Websites regarding newspapers and vendor/commercial were listed according to their paper/company home page given the "shelf-life" of news/related reporting. This allows users to access an information source directly about a specific microburst occurrence in the event that the information has been discontinued by the source/provider. Personal websites of professors/scientists were also searched using keywords, microburst, downburst, downdraft in order to find related publications (see *publications* file).

All files mentioned above form the complete bibliographic and event bases of this project. In the future, a plan to create a website with complete cross-referencing is being considered. This will assist users in finding common themes or information related to operational and research environments. For example, under each journal article (*bib_list* file) in the webpage code, flags will be checked off for information that is available in that article. Flag titles will include topics such as: single event, multiple occurrences, observed, simulated, thermodynamic, kinematics, and others. This will allow the browser to access information by more than one approach as well as across various types of bibliographic resources.

Users interested in accessing literature based materials on microburst events should concentrate their efforts in the *web_base* file. The file focuses on information about event location, damage assessments, field photography, and similar aspects. Users interested in the research of microburst activity should view the *journal_base* file which contains thirty-four journal article summaries pertaining to most/all types (isolated, widespread, bow-echo) of microbursts. If the user is more interested in the operational aspect of microbursts, their effort should be directed toward the *parameter_base*. The *parameter_base* file is an organization of the population of physical parameters within various case study events. These physical parameters can be used to aid in forecasting microbursts through the various WFOs' checklists. Users interested in these parameters may direct their interests to the checklist file. In reviewing the checklist information, the user can retrieve information in the spreadsheet to better understand which event is most likely to occur for a given set of conditions.

Note: The preprints of the study along with the poster and oral Microsoft Power Point presentations made at the National Weather Association 28th Annual Meeting and ULM Geosciences Seminar may be found at after the event data document.

A publication (or report) of the University of Louisiana at Monroe pursuant to an Outreach Program Agreement with the University Corporation for Atmospheric Research and pursuant to National Oceanic and Atmospheric Administration Award No. NA17WD2383. Preliminary Investigation of Observed Microburst Characteristics and Forecasting Methods.